PROJECT NUMBER: 6505
PROJECT TITLE: Special Investigations and Methods Development
PROJECT LEADER: D. C. Watson
PERIOD COVERED: July, 1987

I. X-RAY FLUORESCENCE (XRF)

A. Objective: To provide qualitative and quantitative elemental data on tobacco, cigarette paper and materials evaluation samples.

B. Results:

Qualitative Analysis

XRF data were used to define the elemental composition of seven paper samples. Inclusive were Mg, Al, Si, P, S, K, Ca, Fe, and Ti.

Analysis of degraded pectin samples continue to show Ca and K to be the major components.

Instrumentation

Problems with the Tracor 4020 sample tray have been corrected. The Tracor 5000 was received and installed. A faulty component in the power supply should be replaced by the first of August, at which time the 5000 will be fully operational.

C. References:

PM Notebook #8416, pp. 82-83.

II. ATOMIC ABSORPTION

A. Objective: To provide elemental determinations on tobacco and cigarette paper samples.

B. Results: Magnesium - Two samples of cigarettes were analyzed for Mg content of the filler and paper. One sample was subsequently analyzed for Mg content of the mainstream and sidestream condensate, a sidestream wash, and cigarette ash plus butts. The data showed:

	Sample Code	
	#3652	#3654
Magnesium (Wt. Percent)		
Filler*	0.48	0.40
Paper*	2.4	12.4
Magnesium (µg/cigarette)		
Mainstream	-	0.60
Sidestream	-	4.4
Sidestream Wash	-	27.2

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Ash plus Butts - 12100

*Average of duplicates

Eight cigarette samples were analyzed for Mg content of the paper using both the routine extraction and the microwave digestion procedure. No differences were found.

C. **References**:

1. PM Notebook #8416, pp. 82-83.

2. PM Notebook #8394, p. 21.

III. PESTICIDE LABORATORY

A. **Objective**: To provide analytical data for pesticides in offshore leaf purchase.

B. **Results**:

Three offshore samples have been analyzed for pesticides.

Evaluation of the herbicide derivatization and final cleanup steps have shown that the major source of error is the loss of the methyl ester of the herbicide and internal standard during the N_2 evaporation steps. Unfortunately the compound most affected is the internal standard. Steps have been taken to minimize the loss. Data collected does not demonstrate an obvious benefit to incorporation of the internal standard. Further review is in progress. Recoveries are quantitative for the herbicides and internal standard from a spiked sample.

Twenty-four samples were run for determination of FDC Blue #1 dye to assess its utility as a tracking agent in the foam binder utilization studies.

C. **References**:

PM Notebook #8499.

IV. PROJECT ART

A. **Objective**: Determine the relative efficiencies of extraction of nicotine from stem material using various aqueous salt solutions.

B. **Results**: Samples of bright and burley stem were extracted with 1% aqueous salt solutions with portions taken with time to determine the rate of extraction of nicotine from the stem.

C. **Conclusions**: Comparisons of the aqueous solvent systems and tobaco stem matrix on the extraction rates of nicotine showed:

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1. Deionized water is not significantly lower in efficiency than 1% citric acid, potassium carbonate, or diammonium or monoammonium phosphate solutions.

2. Shredding the stem significantly increases the efficiency of nicotine extraction.

   All extractions were done at room temperature with 5 grams of dry stem in 100 mL of solution.

D. **Plans**: Samples of stem from various stem washings and from evaluations of new washing protocols will be analyzed to determine efficiency of the processes specifically as applied to Project ART needs.

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